Researchers at the University of South Florida have developed a nanoparticle drug delivery system that can specifically induce cancer cells to take up a drug.

Cancer remains the second leading cause of death in the US. Several chemotherapeutic drugs are available to treat cancer, but they all come with significant drawbacks. Many cancer drugs do not specifically target cancer cells, thus they also cause harm to normal tissue. Researchers are trying to create cancer drugs which target unique receptors found only on the cancer cells. One target is a receptor that induces the “micropinocytosis” pathway which makes the cell engulf surrounding material. Scientists are seeking to develop nanoparticles that can activate this receptor to make the cell take up more cancer drugs.

Exploiting this receptor, USF inventors have created a novel, cargo carrying nanoparticle for the targeted delivery of drugs to cancer cells. The nanoparticle carries a drug to cancer cells, where the drug is released. This reduces the treatment’s toxicity to healthy tissue. The nanoparticle is made of non-toxic protein, and it can be produced at a low cost. The nanoparticle has molecules that bind to receptors on a cancer cell, which makes the cell engulf any nearby drug loaded particles. This novel type of uptake is advantageous because a single nanoparticle can prompt a cell to take up multiple drug payloads. This system has been shown to be a potential treatment of lung cancer, and it may enable the specific delivery of more chemotherapy drugs to treat other varieties of cancer.

ADVANTAGES:

- Targeted drug delivery to tumors
- Reduced side effects of cancer drugs
- Made of non-toxic, biodegradable protein
- Easily synthesized

**Targeted Delivery of Chemotherapeutics to Cancer Cells**

**Nanoparticle Structure:**
- **Yellow** - Targeting Molecule
- **Red** - Drug Payload
- **ELP** - Structure Protein